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The theoretical roots of sentence combining as a pedagogical strategy are discussed in this paper, along with recent studies of the development of written syntactic maturity. The paper examines several major sentence combining studies in detail and briefly summarizes additional relevant literature. The instructional implications of sentence combining research are also discussed. (Author/FL)

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The theoretical roots of sentence combining as a pedagogical strategy are discussed, along with several recent studies of language development. Major sentence-combining studies are reviewed, and the instructional implications of the research are presented.

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IMPROVING STUDENT WRITING THROUGH SENTENCE COMBINING: A LITERATURE REVIEW

Joseph Lawlor

Sentence combining, an instructional method for enhancing syntactic fluency in written composition, has received a great deal of attention from the contemporary writing research community. This topic was investigated as part of an inquiry into the current state of composition instruction. This paper discusses the theoretical roots of sentence combining along with recent studies of the development of written syntactic maturity. Next, several major sentence-combining studies are examined in detail, and additional relevant literature is briefly summarized. Finally, the instructional implications of sentence-combining research are discussed.

Theoretical Roots: Transformational Grammar and Syntactic Maturity

Sentence combining has its roots in the transformational-generative theory of grammar first described by Noam Chomsky (1957). Although a complete description of this theory is beyond the scope of this paper, certain general features of transformational-generative grammar are fundamental to the concept of sentence combining. Chomsky theorized that there are two levels of language, the "surface structure" and the "deep structure." Constance Weaver, in Grammar for Teachers (1979), defines these two levels:

> . . . we might say that the surface level consists of a linear sequence of clauses, phrases, words, and sounds or letters. The deep level consists of the underlying propositions and the relationships among them. . . . Or to put it more generally, a sentence might be defined as a linear sequence of linguistic units (a surface structure) which reflects one or more underlying propositions (a deep structure). (p. 104)

According to transformational-generative theory, then, deep-structure "propositions" are transformed into surface-structure sentences, based upon the language user's internalized system of grammatical rules. Implicit in this theory is the concept that there is no one-to-one correspondence between deep structure and surface structure; i.e., underlying propositions can be represented by a multiplicity of surface structures. Thus, the following "kernel" sentences (which, only for purposes of illustration, can be said to represent deep-structure propositions*) can be transformed into a variety of surface structures, only two of which are illustrated:

Deep Structure		Surface Structure
The rain ruined the coat. The coat is new. John owns the coat.	→	1) The rain ruined John's new coat. 2) John's new coat was ruined by the rain.

Although Chomsky's transformational-generative grammar provided the theoretical basis for sentence combining, it was Kellogg Hunt's first study (1965) that provided the impetus (and the methodological framework) for much of the subsequent research in sentence combining. The purposes of Hunt's study were (1) to provide a systematic procedure for the quantitative analysis of syntactic structures and (2) to identify developmental trends in syntactic maturity** in the writing of fourth-, eighth-, and twelfth-grade students.

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*Chomsky cautioned that "one must be careful not to confuse kernel sentences with the basic strings that underlie them" (1965, p. 18). Thus these kernel sentences themselves are actually based on even "deeper" structures.

**Hunt defined maturity as "nothing more than 'the observed characteristics of writers in an older grade.' It has nothing to do with whether older students write 'better' in any general stylistic sense." (1965, p. 5)

Hunt analyzed 1000-word samples of free writing collected from 54 "average" students (as defined by IQ scores), 18 from each of the three grade levels. In addition, he also examined similar samples from nine articles appearing in Harper's and nine appearing in Atlantic Monthly. In order to provide meaningful statistical data, Hunt devised the "minimal terminable unit" (abbreviated as "T-unit") as the basis for his analysis. Previous syntactic analyses had relied on counts of words-per-sentence, words-per-clause, and subordinate clauses-per-total clauses (also known as the "subordination ratio") as measures of growth in written expression. However, Hunt found that these indices had limited value for his study. In discussing the difficulties of the words-per-sentence index, for example, Hunt stated:

> Certain children simply do not use periods. Others write innumerable ands where an educated adult would have written periods; they under-punctuate. If a sentence is defined as whatever is written between terminal marks, and if sentence length is assumed to be an index of maturity, then the child who under-punctuates the most or uses and the most will, regrettably, be credited with the greatest language maturity (1965, pp. 7-8)

The T-unit, which Hunt defined as "one main clause plus the subordinate clauses attached to or embedded within it" (1965, p. 49), is not affected by the writer's idiosyncratic punctuation or by the excessive use of and. The following passage illustrates the efficacy of the T-unit as the basis for syntactic analysis. This fourth-grade writing sample is punctuated as a single sentence, 68 words long. Hunt pointed out that a simple count of words per sentence would indicate that this sentence is four times as long as the average sentence of a twelfth-grade student:

> I like the movie we saw about Moby Dick the white whale the captain said if you can kill the white whale Moby Dick I will give this gold to the one that can do it and it is worth sixteen dollars they tried and tried but while they were trying they killed a whale and used the oil for the lamps they almost caught the white whale (Hunt, 1965, p. 20).

When the passage is divided into its six constituent T-units, though, meaningful comparisons can be made with writing samples collected from other grade levels:

1. I like the movie we saw about Moby Dick, the white whale.
2. The captain said if you can kill the white whale, Moby Dick, I will give this gold to the one that can do it.
3. And it is worth sixteen dollars.
4. They tried and tried.
5. But while they were trying they killed a whale and used the oil for the lamps.
6. They almost caught the white whale. (Hunt, 1965, p. 21)

In a detailed statistical analysis of various indices of syntactic maturity, Hunt found that T-unit length was the most reliable index, followed by clause length and the number of clauses per T-unit. Tables 1-3 summarize Hunt's data on the three most significant indices of syntactic maturity.

Table 1*
Average Number of Words per T-unit

8.6	11.5	14.4	20.3
Grade 4	Grade 8	Grade 12	Skilled Adults

*Based on Hunt (1965), p. 56.

Table 2*
Average Number of Words per Clause

6.6	8.1	8.6	11.5
Grade 4	Grade 8	Grade 12	Skilled Adults

Table 3*
Average Number of Clauses per T-unit

1.30	1.42	1.68	1.78
Grade 4	Grade 8	Grade 12	Skilled Adults

Hunt's data reveal several developmental trends in syntactic maturity. Table 1 indicates that older writers tend to construct longer T-units, a finding that is not particularly surprising. What is striking, however, is that the difference in average T-unit length between twelfth-grade samples and the samples of skilled adults (5.9 words per T-unit) surpasses the gain shown between twelfth-grade samples and fourth-grade samples (5.8 words per T-unit). This suggests that twelfth-graders may indeed have again as much to learn about syntactic constructions as they have already learned in their previous eight years of school.

The data in Tables 2 and 3 are best interpreted in light of Hunt's major findings about the frequency of certain grammatical constructions at each grade level. Crymes (1974) summarized Hunt's conclusions:

(1) Fourth graders produce the same kinds of grammatical structures as the older students but they don't produce all kinds in the same amount as older students do;

(2) The T-units of twelfth graders contain almost four times as many adjective clauses and about twice as many noun clauses as those of fourth graders; and

*Based on Hunt (1965), p. 56.

> (3) The older students write substantially more non-clausal modifiers (adjectives, prepositional phrases, infinitives, and participles) and more "near clause" nominals (gerund and infinitival nominals) than the younger children. (pp. 4-5)

Thus, as writers grow older, they tend to write longer clauses (see Table 2), they tend to include more clauses in each T-unit (see Table 3), and, at the same time, they tend to compress more information into their T-units. As Crymes (1974) noted, this is certainly an important insight into the development of syntactic maturity:

> The fact that [students'] T-units grow longer even though they increasingly de-form, and hence shorten, the embedded sentences, indicates that not only do they embed more sentences (rather than retaining them as main clauses) but also they expand their ideas more, including more information. (p. 6)

Although Hunt's study did not attempt to validate sentence combining as an instructional strategy, it did raise an important question concerning such a strategy; i.e., if it were indeed possible to identify developmental stages in the normal growth of student writers, shouldn't it also be possible to design an instructional program to enhance this growth? Hunt stated at the time that such a "sentence-building program" seemed to be suggested by his study:

> The aim would be to widen the student's span of grammatical attention and concern. The method would be for him to reduce independent clauses to subordinate clauses and non-clauses, consolidating them with adjoining clauses and T-units. He would work up to structures of considerable depth and complexity comparable to those exhibited by twelfth graders and superior adults. (Hunt, 1965, p. 157)

In a later study, O'Donnell, Griffin, and Norris (1967) substantiated Hunt's findings. O'Donnell et al. analyzed the oral language of students in kindergarten and grades 1 and 2; they also studied the oral and written

language of students in grades 3, 5, and 7. Their results confirmed the reliability of Hunt's measures as accurate predictors of syntactic maturity. Moreover, O'Donnell et al. found that T-unit length, Hunt's most reliable index, was also a significant predictor of maturity in oral language production. Unlike Hunt, though, O'Donnell et al. found that there were significant increases across grade levels in three major transformational constructions--adjectivals, nominals, and adverbials. Hunt had found significant differences only in the first two structures.

Encouraged by the results of O'Donnell et al. (1967) and by the findings of his own 1965 study, Hunt (1970) next attempted to validate his syntactic indices in a controlled-writing experiment. The 1965 study had relied on free-writing samples, with no control over the subject matter or mode of discourse. However, in the 1970 study, Hunt provided his subjects with a 32-sentence passage, directing them to rewrite it "in a better way." This controlled-writing stimulus, developed by Roy O'Donnell, is presented below.

Aluminum

Directions: Read the passage all the way through. You will notice that the sentences are short and choppy. Study the passage, and then rewrite it in a better way. You may combine sentences, change the order of words, and omit words that are repeated too many times. But try not to leave out any of the information.

Aluminum is a metal. It is abundant. It has many uses. It comes from bauxite. Bauxite is an ore. Bauxite looks like clay. Bauxite contains aluminum. It contains several other substances. Workman extract these other substances from the bauxite. They grind the bauxite. They put it in tanks. Pressure is in the tanks. The other substances form a mass. They remove the mass. They use filters. A liquid remains. They put it through several other processes. It finally yields a chemical. The chemical is powdery. It is white. The chemical is alumina. It is a mixture. It contains aluminum. It contains oxygen. Workmen separate the

> aluminum from the oxygen. They use electricity. They finally produce a metal. The metal is light. It has a luster. The luster is bright. The luster is silvery. The metal comes in many forms (Hunt, 1970, pp. 64-65).

Hunt collected controlled-writing samples from 50 students in each of the following grades: 4, 6, 8, 10, and 12. In addition, samples were obtained from two groups of adults, one group classified as "skilled" and the other "average." Analysis of the samples revealed the same developmental trends found in the 1965 study. That is, older writers tended to construct longer T-units and clauses, consolidating more of the input sentences into each T-unit. Thus, on the average, fourth graders combined 1.1 of the input kernels into each T-unit, while eighth-graders combined 2.4, and skilled adults consolidated 5.1 of the kernels into each T-unit. Average words per T-unit and words per clause also increased across grade levels, although the gains were consistently lower than in the 1965 free-writing experiment. Tables 4 and 5 compare the results of Hunt's two studies on words per T-unit and words per clause.

Table 4*

Average Words per T-unit

	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12	Average Adults	Skilled Adults
Free Writing (Hunt, 1965)	8.60	---	11.50	---	14.40	---	20.30
Controlled Writing (Hunt, 1970)	5.42	6.84	9.84	10.44	11.30	11.85	14.78

*Based on Hunt (1965), p. 56, and Hunt (1970), pp. 17-20.

Table 5*

Average Words per Clause

	Grade 4	Grade 6	Grade 8	Grade 10	Grade 12	Average Adults	Skilled Adults
Free Writing (Hunt, 1965)	6.60	---	8.10	---	8.60	---	11.50
Controlled Writing (Hunt, 1970)	5.19	5.76	6.79	7.35	7.85	8.40	9.95

Hunt concluded that the controlled-writing task could, within limits, provide reliable measures of syntactic maturity. He noted, though, that the stimulus lent itself to adjectival transformations, and that a controlled stimulus designed to elicit nominalizations would be difficult to construct. Such a stimulus would require the use of a place-holding cue such as something, resulting in awkward, unnatural-sounding sentences. Nevertheless, Hunt suggested that the rewriting instrument was a convenient, reliable method for evaluating syntactic maturity.

In summary, the work of Hunt (1965, 1970) and O'Donnell et al. (1967) showed that transformational analysis could provide a convenient means for measuring syntactic development in student writers. Furthermore, normal patterns of growth had been established, and a reliable unit of syntactic analysis had been devised. Thus the stage was set for "a period of rich and varied curricular experimentation" (Hunt, 1977, p. 102) in which the sentence-building program alluded to by Hunt could be empirically tested.

*Based on Hunt (1965), p. 65, and Hunt (1970), pp. 17-20.

Donald Bateman and Frank Zidonis

The Effect of a Study of Transformational Grammar on the Writing of Ninth and Tenth Graders
1966

At approximately the same time as Kellogg Hunt (1965) was conducting his study of the grammatical structures written by students in grades 4, 8, and 12, Donald Bateman and Frank Zidonis conducted a two-year experiment to measure the effect of a study of transformational-generative grammar on the writing of ninth-grade students. Although the Bateman-Zidonis experiment was clearly not a sentence-combining study, its effect on the design of subsequent sentence-combining research justifies a discussion of the experiment here. Briefly, Bateman and Zidonis sought to discover whether, as a result of studying transformational-generative grammar, students would (1) learn to apply transformational rules in their writing, (2) increase their "repertoire of grammatical structures" (Bateman and Zidonis, 1966, p. 3), (3) produce a higher proportion of well-formed sentences, and (4) reduce the occurrence of transformational errors.

Experimental Design

The investigators selected 50 ninth-grade students from the University School at Ohio State University to participate in the study. The students were randomly assigned to two groups: an experimental group, which studied the principles of transformational-generative grammar, and a control group, which studied no formal grammar. Pre- and post-treatment writing samples were collected from each group and were evaluated on three criteria:

1) Structural Complexity Score - Each sentence was analyzed to identify the number of transformations it contained, selected from a list of 46 such transformations identified by the researchers.

2) Proportion of Well-Formed Sentences - The total number of sentences produced by each student was divided into the number of "well-formed" sentences, i.e., those sentences that were "intuitively acceptable to the analysts and derivable from the rules of grammar" (Bateman & Zidonis, 1966, p. 13).

3) Error Change Score - Five classes of transformational errors were identified and tallied for each student's writing sample.

Results and Conclusions

The comparison of pre- and post-treatment data for the experimental and control groups tended to confirm the hypotheses of the study. First, the average structural complexity scores for well-formed sentences were higher in the experimental group's post-treatment writing than in the control group's samples.* Second, the proportion of well-formed sentences was found to be significantly higher in the experimental group's writing. Third, the experimental group tended to reduce the occurrence of errors more than the control group, although the difference between the two groups was not statistically significant.

Based upon their analysis of the data, Bateman and Zidonis concluded that high school students can learn the principles of generative grammar relatively easily, and that a knowledge of generative grammar (1) increases the proportion of well-formed sentences in students' writing, (2) enables students to produce sentences of greater structural complexity, and (3) leads to a reduction of errors in writing.

*However, Bateman and Zidonis admitted that most of the experimental group's gain in structural complexity could be attributed to the inordinately large gains made by only four students.

Criticism of the Bateman-Zidonis Study

Although the Bateman-Zidonis study seemed to make a strong case for the study of transformational-generative grammar as an aid to enhancing the syntactic abilities of student writers, later researchers seriously questioned the study's results. John Mellon, an early sentence-combining investigator, saw the Bateman-Zidonis study as one that "employs questionable design and analytical procedures and rests on a hypothesis which seems altogether unreasonable" (Mellon, 1969, p. 14). First, Mellon faulted the investigators for their failure to specify the course of study followed by their control group, a flaw that Mellon claimed rendered their data "quite meaningless" (1969, p. 7). Furthermore, Mellon criticized Bateman and Zidonis for using the orthographic sentence as the basis for their structural analysis when Hunt's findings (1965) indicated that the independent clause (or T-unit) was more reliable.* Mellon was also concerned by the fact that the Bateman-Zidonis students were not a representative sample and that the discourse modes of the writing samples were not described.

Besides the methodological flaws of the Bateman-Zidonis study, Mellon also found the underlying hypothesis of the study to be untenable. In the introduction to their report, Bateman and Zidonis had claimed that generative grammar was "in essence a representation of the psychological processes of producing sentences" and that "pupils must be taught a system that accounts for well-formed sentences before they can be expected to produce more of such sentences themselves" (1966, p. 2). Mellon, however, denied these assertions. He claimed that although transformational-generative grammar

*In a later study, Frank O'Hare (1973) pointed out that the Bateman and Zidonis study was originally published in the same year as Hunt's. Thus Mellon's criticism may be somewhat unjustified.

can indeed describe the process of sentence formation, in no way does it represent the conscious psychological processes of the speaker/writer. Mellon also stated that "Bateman and Zidonis ignore the fact that children have been producing grammatically complex and . . . for the most part well-formed sentences since their preschool years" (1969, p. 13).

In a later research report, Frank O'Hare (1973) generally agreed with Mellon's criticism of Bateman and Zidonis, although O'Hare felt that Mellon's critique was "a little too severe" (O'Hare, 1973, p. 8). O'Hare was not as troubled as Mellon by the methodological flaws of the study, but he did feel that Mellon was correct in faulting Bateman and Zidonis for their claim that students had to be taught a grammar system that accounted for well-formed sentences before they could be expected to produce these sentences in their writing. O'Hare noted that "abundant research has demonstrated that young children have already mastered a very large proportion of the structures of English before they get to school and quickly learn to handle the remainder in elementary school" (1973, p. 9).

According to O'Hare, the major contribution of the Bateman-Zidonis study was its finding that the syntactic complexity of student writing could be enhanced by direct instruction. Thus O'Hare stated:

> The significance of this study lies in the discovery that students who study transformational grammar end up writing sentences that have fewer errors and are more complex syntactically than students who do not. That is significant indeed. (1973, p. 9)

John Mellon

Transformational Sentence-Combining: A Method for Enhancing the Development of Syntactic Fluency in English Composition 1969*

In a paper presented at the 1978 Miami Conference on Sentence Combining and the Teaching of Writing, John Mellon (1979) stated that "my own contribution to the research on sentence combining was to begin it" (p. 1). Thus the much-abused term "seminal study" does indeed describe this work. In fact, Mellon's experiment became the model for nearly every sentence-combining study that followed in the next ten years.

In reviewing the literature dealing with the relationship between grammar study and composition, Mellon (1969) noted that there were two traditional claims for the value of grammar study. First was the view that the formal study of grammar enabled students to reduce errors in their writing. Second was the assumption that studying grammatical principles led to the development of mature sentence structure in students' compositions. Mellon found, however, that most of the research to date had been concerned with the error-reduction claim, and that this research suggested that grammar study has little or no effect on either the type or frequency of errors in student writing. The only major study designed to test the sentence-structure claim for grammar study was the Bateman-Zidonis experiment (1966), whose methodological flaws, according to Mellon, rendered the results meaningless. Thus Mellon concluded that instruction designed to enhance the development of mature sentence structure had been largely unexplored. This then provided the rationale for his investigation of transformational sentence combining.

*This study was originally published in 1967 as USOE Cooperative Research Project 5-8418.

As Mellon was in the process of designing his experiment, Kellogg Hunt (1965) published his important study of the development of syntactic maturity in the writing of fourth-, eighth-, and twelfth-graders. Mellon recognized that Hunt's T-unit was precisely the unit of grammatical analysis that he required for his own experiment. As noted earlier, Hunt had found that T-unit length was the most reliable index of syntactic maturity, followed by clause length, and then the ratio of subordinate clauses to total clauses. In interpreting Hunt's data, Mellon noted that growth in T-unit and clause length is largely a result of relative and nominal transformations:

> Increased use of relative transforms means in effect that the student more often makes secondary statements, either fully formed or elliptical, about the nouns in his main sentences. Greater use of nominalized sentences means that he more often predicates upon statements, as it were, rather than upon simple nouns (Mellon, 1969, p. 19).

Although Hunt's data had also indicated that normal growth in syntactic maturity proceeds at an extremely slow rate, Mellon hypothesized that a systematic course of instruction could enhance this rate. He established the following four conditions for the design of this instruction:

1) Instruction should be "a-rhetorical"; i.e., students should be freed from the burden of generating their own content so that they can attend to syntax.

2) Instruction should present students with sentences whose structure is more mature than those the student is already producing. (Mellon criticized traditional grammar texts for their reliance on simple, immature sentences that are amenable to grammatical analysis but provide poor models for students.)

3) The ultimate outcome of instruction should be the "pseudo-production" of fully formed sentences with a predetermined structure.

4) The content of the sentences to be produced should be provided to the student at the outset of the exercise.

Based on these four conditions, Mellon developed a series of 281 sentence-combining problems, emphasizing nominal and relative transformations. The problem below illustrates the form of Mellon's exercises:

> The children clearly must have wondered SOMETHING.
> The bombings had orphaned the children.
> SOMETHING was humanly possible somehow. (T:wh)
> Their conquerors pretended SOMETHING. (T:infin-T:exp)
> Chewing gum and smiles might compensate for the losses. (T:fact)
> The losses were heartbreaking.
> They had so recently sustained the losses.
> (Mellon, 1969, p. 22)

The student proceeds down the sentences, embedding the structures according to the cues provided in the problem. The top sentence is the main clause; the right-hand indentations indicate the depth of the embedding. The capitalized word SOMETHING marks an open nominal slot, and a repeated noun is a signal for relativization. The cues in parentheses direct the student to apply transformations that have been studied in class. For example, T:wh directs the student to embed the sentence as a question clause beginning with a wh word. Thus the student would relativize the second sentence, nominalize the third sentence, and arrive at the following partial solution:

> The children whom the bombings had orphaned clearly must have wondered how SOMETHING was humanly possible . . .

The combining continues until all the sentences have been appropriately transformed and embedded in the main clause. Only then does the student write out the following solution:

> The children whom the bombings had orphaned clearly must have wondered how it was humanly possible for their conquerors to pretend that chewing gum and smiles might compensate for the heartbreaking losses which they had so recently sustained (Mellon, 1969, p. 23).

Experimental Design

Mellon selected the seventh grade for his experiment because he felt that this was the level at which "the most noteworthy growth of syntactic fluency occurs" (Mellon, 1969, p. 27). 247 students from 12 classes in the metropolitan Boston area were selected for this study. 100 of these students were assigned to the experimental group, which practiced sentence combining as part of a study of transformational grammar. Mellon was careful to note that the sentence-combining problems were not represented as composition practice, and that students were never urged to imitate the combining processes in their own writing. Mellon stated that "the assumption was simply that when he came to writing, the student would, as a natural result of prior sentence-combining practice, produce sentences whose structures would be more mature than those of the sentences he would otherwise have written" (Mellon, 1969, p. 25).

Another 100 students were assigned to the control group, which received traditional grammar instruction, including parsing exercises. The remaining 47 students were assigned to a placebo group that studied no formal grammar but received extra composition and literature instruction.

Nine pre- and post-treatment writing samples (covering the descriptive, narrative, and expository modes) were collected from all three groups. Ten T-units from each sample were selected for analysis, generally following Hunt's methodology. However, unlike Hunt, Mellon counted adverbial clauses of condition, concession, reason, and purpose as T-units. In addition to analyzing the syntactic structures of the students' compositions, Mellon selected a small sample (8%) of the papers for an evaluation of overall quality.

Results

In his T-unit analysis, Mellon examined the following twelve indices of syntactic fluency:

mean T-unit length
ratio of subordination to coordination
nominal clauses per 100 T-units
nominal phrases per 100 T-units
relative clauses per 100 T-units
relative phrases per 100 T-units
relative words per 100 T-units
embedded kernel sentences per 100 T-units
percentage of T-units containing one or more modifying clusters
mean length of modifying clusters
percentage of T-units containing one or more embedded kernels
average depth level of embedding

On all twelve of these measures, Mellon found that the experimental group achieved significantly higher gains than did either the control or placebo group. In comparison with Hunt's (1965) norms, the experimental group exhibited a growth rate that was two to three times greater than what would have normally occurred. Mellon found no significant difference in syntactic fluency between the control and placebo groups, suggesting that traditional grammar study has a negligible effect on the development of mature sentence structure.

The results of the overall quality rating, however, were somewhat ambiguous. The sample papers were typewritten, and spelling and punctuation errors were corrected. Six teachers evaluated the papers holistically, although they were instructed to consider the ideas, organization, style, sentence structure, and vocabulary of the compositions. Generally, the raters judged the writing of the control group to be superior to that of the experimental group, but there was no significant difference between the experimental and placebo groups.

Although Mellon admitted that the quality rating was disappointing, he suggested that the inadequate size of the sample and the exceptional teaching ability of one of the control-group instructors may have contributed to the anomaly. Mellon also noted that the enhanced syntactic growth of the experimental group would not likely be noticed by the raters, "who of course were simultaneously attending to four other factors of writing quality in addition to that of sentence structure" (Mellon, 1969, p. 69). Moreover, Mellon stated that the primary purpose of the quality rating was to determine if the sentence-combining practice had produced undersirable side effects in students' writing, such as "strained, garbled, or otherwise tortured sentence structure" (1969, p. 69). In this respect, the quality rating proved to be satisfactory; i.e., there were no negative side effects apparent in the experimental group's writing.

Conclusions

Mellon concluded that sentence combining could indeed enhance the syntactic fluency of student writers. In addition he noted several other implications of his findings:

- Sentence combining can be a valuable supplement to reading, discussing, and writing in the language arts class. However, sentence combining is not meant to supplant these other activities.
- Sentence combining is not dependent on a knowledge of grammar (traditional or transformational). Mellon suggested that the grammatical terms used as cues in his exercises could be rewritten in non-technical language (a method subsequently employed by Frank O'Hare, 1973).
- Sentence combining is not a composition or rhetoric program. It is not intended to teach writing, but only to provide a means for increasing the student's syntactic options.

- Students generally find sentence-combining exercises to be challenging and interesting. They approach the exercises with much the same enthusiasm as they have for puzzles and games.

Criticism of the Mellon Study

Although Mellon's research had a profound impact on the development of sentence combining as an accepted pedagogical strategy, the study was not without its critics. In a journal article appearing shortly after the initial publication of the Mellon experiment, Francis Christensen (1968b) claimed that Mellon's emphasis on nominalization and restrictive relativization was "on the wrong track" (p. 575). He suggested that subordination is not indicative of a truly mature style, but rather is symptomatic of "the lumpy, soggy, pedestrian prose that we justly deride as jargon or gobbledegook" (1968b, p. 575).

Christensen's concept of a mature style is based on the "cumulative sentence"--a short base clause followed by a series of loosely connected "free modifiers." Generally, these modifiers are prepositional phrases, nonrestrictive relative clauses, noun, verb, adjective, and adverb phrases, and absolutes. In his Notes Toward a New Rhetoric (1967), Christensen illustrates the cumulative sentence with the following example, written by Walter Van Tillburg Clark. The base clause is underlined here, and it is followed by five free modifiers:

> He could sail for hours, searching the blanched grasses below him with his telescopic eyes, gaining height against the wind, descending in mile-long, gently declining swoops when he curved and rode back, never beating a wing (Christensen, 1967, p. 10).

According to Christensen's analysis of professional writers, the cumulative sentence is the hallmark of mature prose. The strength of the

cumulative sentence is that it is easy to read, while the complex sentence (as produced in the Mellon experiment) is difficult. Thus Christensen stated:

> A mature style must say much in little, agreed, but a mature style must be easy to decode. The long clause is not the mark of a mature style but of an inept style--the easy writing that's curst hard reading. The real problem in writing is to reconcile these two seeming opposites--to pack much into little, but to pack it so that it can be readily unpacked (1968b, p. 576).

Christensen also criticized the a-rhetorical setting of Mellon's sentence-combining exercises. In calling for an instructional program emphasizing the use of free modifiers, Christensen claimed that such a program rightly belonged "in the rhetorical setting of the composition course, where the student must supply the content" (1968b, p. 579).

In the epilogue to the 1969 version of Transformational Sentence-Combining, Mellon responded to Christensen's criticism. First, he objected to Christensen's inaccurate reporting of the Mellon study. Christensen had faulted Mellon for forcing his students to produce overly complex sentences averaging 30 words in length, while professional writers rarely average more than 20 words per sentence. Apparently, Christensen based his average on the fifteen sample problems presented in the appendix to the Mellon report. However, Mellon pointed out that these samples included seven of the most difficult exercises in the program; thus they were certainly not typical of the entire series of 281 problems. Furthermore, Mellon noted that the post-treatment writing samples of the experimental group averaged 11.25 words per T-unit, "a little over one third as long as the 30-word average Christensen reports" (Mellon, 1969, p. 79).

Mellon's second objection to the Christensen critique was that Christensen misinterpreted sentence combining as a complete program for teaching writing, when in fact the exercises were "limited strictly to a procedure for heightening the growth rate of children's developing syntactic fluency" (Mellon, 1969, p. 81). Mellon claimed that his sentence-combining practice did not deal with the stylistic aspects of composition instruction. In fact, he suggested that the teaching of style should not even be attempted until senior high school because younger writers do not have the necessary maturity "to think consciously about the 'how' of expression while maintaining at the same time an appropriate concern for the 'what'" (Mellon, 1969, p. 82).

Finally, Mellon replied to Christensen's concern about the absence of free modifiers in the sentence-combining curriculum. Mellon defended his program by pointing out the following:

1) The development of syntactic maturity generally proceeds through three stages: (1) elaboration through separate sentences, (2) elaboration through contained clauses, and (3) elaboration through reduced clauses (e.g., prepositional phrases, absolutes). Thus Christensen's attempt to jump directly from the first stage to the third ignores the natural developmental sequence.

2) Mellon's experimental curriculum was originally designed as the first year of a three-year program. The free modifiers suggested by Christensen had been earmarked for instruction in the second year of the program.

James Moffett also discussed the Mellon experiment in his Teaching the Universe of Discourse (1968b). Although he praised Mellon's work as "intelligently designed, expertly executed, and cautiously interpreted" (p. 166), Moffett was concerned by the a-rhetorical setting of the sentence-combining exercises:

> But what is not known is whether the a-rhetorical learning context divorced syntactic fluency from syntactic appropriateness, that is whether the exercises made students value elaboration for its own sake and become facile without relating this facility to those communicative, stylistic, and rhetorical needs that make elaboration desirable in the first place (Moffett, 1968b, p. 170).

Essentially, Moffett's concern was that language enrichment activities should take advantage of the student's own natural desire to manipulate or "play" with language. In responding to Moffett's criticism, Mellon (1969) claimed that his sentence-combining exercises are not incompatible with Moffett's "naturalistic" theory. Mellon listed several activities recommended in Moffett's A Student-Centered Language Arts Curriculum (1968a) and concluded that "looking at the list culled from the Moffett curriculum, one sees that sentence-combining would be but one kind of 'language game'" (Mellon, 1969, p. 84). Mellon also reiterated that sentence combining does not depend on a formal study of grammar. With minor revisions to the cuing system, Mellon claimed, sentence-combining could indeed supplement Moffett's language enrichment activities.

Barbara Miller and James Ney

The Effect of Systematic Oral Exercises on the Writing of Fourth-Grade Students
1968

Miller and Ney's sentence-combining study was an attempt to apply recent developments in audio-lingual research to the teaching of syntactic manipulation in the elementary grades. Thus the Miller-Ney experimental curriculum relied on oral sentence-combining exercises featuring three types of syntactic structures:

1) who and which adjectival clauses and their reductions; e.g.*:

He looked at the boy.
The boy came out of the river. → He looked at the boy who came out of the river.

2) adverbial clauses in the initial and final positions; e.g.:

The princess couldn't be married.
She was too proud. → The princess couldn't be married because she was too proud.

3) nominalizations in the subject and predicate; e.g.:

Something disturbed the king.
The princess talked. → The talking of the princess disturbed the king.

Experimental Design

Two fourth-grade classes participated in the study, one class (26 students) functioning as the experimental group, and the other (24 students) as the control group. Experimental instruction included choral reading of model cue sentences and responses, individual oral responses to cue sentences, choral reading of prose passages from which the sentence-combining problems had been developed, and written responses to orally presented cue sentences. The experimenters postulated that the written exercises would "effect transfer of training from oral manipulation of sentences to the writing of these sentences" (Miller and Ney, 1968, p. 48). The control group followed a "normal" course of study including reading and free-writing practice.

Results

Analysis of the pre- and post-treatment writing samples revealed that the experimental group wrote significantly longer compositions at

*All examples are taken from Miller and Ney (1968), pp. 48-49.

post-test, suggesting that the sentence-combining exercises promoted "greater freedom and facility" (Miller and Ney, 1968, p. 60) in written expression. The experimental group also used the structures they had practiced more frequently than did the control group. In addition, experimental students wrote a significantly greater number of multi-clause T-units than control students. However, there were no significant differences between the groups on the two most reliable indices of syntactic maturity, T-unit length and clause length (Hunt, 1965, 1970).

Conclusions

Miller and Ney concluded that orally-based sentence-combining practice could be an effective means for improving the written composition abilities of fourth-grade students. Students exposed to the sentence-combining curriculum over a period of approximately nine months wrote longer compositions with more complex sentences, incorporating many of the structures they had practiced.

Frank O'Hare

Sentence Combining: Improving Student Writing Without Formal Grammar Instruction
1973

Drawing upon Mellon's earlier sentence-combining research (1969), Frank O'Hare conducted a similar study at Florida State University during the 1969-70 academic year. Although he generally agreed with Mellon's theory of sentence combining, O'Hare was concerned about several methodological problems that he found in the Mellon experiment. Thus the O'Hare study was a replication and a modification of Mellon's work.

In his research report, O'Hare reviewed the Mellon study, pointing out three major problems. First, O'Hare objected to Mellon's claim that sentence combining is a-rhetorical. Mellon had insisted that his sentence-combining curriculum "had nothing to do with the teaching of writing" (Mellon, 1969, p. 77). In rejecting this claim, O'Hare drew the following analogy:

> Football coaches have their players practice play after play in an "a-game" setting, often with no opposition, so that they will be able to execute efficiently in an actual game. Surely the coach at practice is teaching football. Similarly, students exposed to sentence-building exercises even in an "a-rhetorical" setting are in a very real sense being taught writing (O'Hare, 1973, p. 68).

O'Hare's second criticism of Mellon's study centered on the inclusion of the sentence-combining practice within a transformational grammar course. Mellon had claimed that it was the sentence combining, not the grammar study, that had caused the syntactic gains made by his experimental group. However, O'Hare was not convinced that this was the case:

> Was it the study of this particular transformational grammar that led to the syntactic gains made by Mellon's experimental group? Or was it the combining practice only that led to these increases? Or was it the interaction of the grammar study and the combining practice? The design of the Mellon study does not permit this question to be answered . . . (O'Hare, 1973, p. 12).

Finally, O'Hare referred to the troublesome fact that Mellon's experimental group was judged to be inferior to the control group in overall writing quality. Mellon had attributed this to problems with the sample size and/or the exceptional talent of one of the control-group teachers. O'Hare was convinced that a more representative sample would have favored the experimental group.

Based on his criticism of the Mellon study, O'Hare planned his experiment to test the effect of grammar-free sentence combining on the development of syntactic maturity and overall writing quality. O'Hare's sentence-combining exercises were adapted from Mellon's curriculum, with several changes. First, where Mellon used grammatical terms to cue the combining processes (e.g., T:fact directed the student to construct a nominal fact clause), O'Hare substituted the actual word that was to be used in the embedding (e.g., T:fact became THAT in the O'Hare cuing system). Second, Mellon used right-hand indentations to indicate the depth of the embedded kernels, but O'Hare did not feel that this was necessary. Third, in Mellon's exercises, a repeated noun was a signal for relativization. O'Hare found that his students had difficulty with this cue for single-adjective embeddings, so he underlined the adjective that was to be retained in the sentence; everything that wasn't underlined was to be deleted. The following examples illustrate the differences between the two formats:

Mellon's original exercise:

The children clearly must have wondered SOMETHING.
The bombings had orphaned the children.
SOMETHING was humanly possible somehow. (T:wh)
Their conquerors pretended SOMETHING. (T:infin-T:exp)
Chewing gum and smiles might compensate for the losses. (T:fact)
The losses were heartbreaking.
They had so recently sustained the losses.
(Mellon, 1969, p. 22)

O'Hare's adaptation:

The children clearly must have wondered SOMETHING.
The bombings had orphaned the children. (WHOM)
SOMETHING was humanly possible somehow. (WHY)*

*Apparently through an oversight, WHY appears in O'Hare's text as the cue for this embedding. However, the intended cue was probably HOW. Similar exercises in the appendix to the O'Hare report use the latter cue.

Their conquerors pretended SOMETHING. (IT-FOR-TO)
Chewing gum and smiles might compensate for the losses. (THAT)
The losses were heartbreaking.
They had so recently sustained the losses. (WHICH)
(O'Hare, 1973, p. 29)

Solution:

The children whom the bombings had orphaned clearly must have wondered how it was humanly possible for their conquerors to pretend that chewing gum and smiles might compensate for the heartbreaking losses which they had so recently sustained (O'Hare, 1973, p. 29).

Experimental Design

O'Hare's study involved 83 seventh-graders attending the Florida State University high school. The seventh grade was selected so that the study would parallel Mellon's research. Students were randomly assigned to two experimental and two control classes. O'Hare and another instructor each taught one experimental class and one control class.

The curriculum of both groups emphasized composition and literature; neither group received formal grammar instruction. Although the experimental group studied the same units of instruction as the control group, the experimental group's units were shortened to allow time for the sentence-combining practice.

O'Hare collected five pre- and post-treatment writing samples, covering the narrative, descriptive, and expository modes, from both groups. The first ten T-units from each composition were selected for analysis. Thus each student contributed fifty T-units to the pre-treatment and fifty T-units to the post-treatment sample.

In order to compare the overall quality of the two groups' writing samples, O'Hare selected 60 post-treatment compositions (30 narrative and

30 descriptive) divided equally between the experimental and control groups. Each composition was typewritten, and all errors in capitalization, punctuation, and spelling were corrected. The papers were then matched into pairs across groups, according to the I. Q. and sex of the writers. These matched pairs were evaluated by eight judges, who were instructed to choose the better composition in each pair. Although the evaluation was holistic, raters were directed to base their judgments on the ideas, organization, style, vocabulary, and sentence structure of the papers.

Results

The results of O'Hare's study dramatically validated his hypotheses. In a T-unit analysis of the pre- and post-treatment compositions, the experimental group scored significantly higher than the control group on six indices of syntactic maturity. In fact, on four of the six measures, O'Hare's seventh-graders surpassed the twelfth-grade norms established by Hunt (1965). Table 6 compares Hunt's data with O'Hare's results:

Table 6*

Comparison of Six Measures of Syntactic Maturity

Index	Hunt (1965): 12th Grade	O'Hare (1973): 7th Grade
Words/T-unit	14.4	15.75
Clauses/T-unit	1.68	1.84
Words/Clause	8.6	8.55
Noun Clauses/ 100 T-units	29.	23.55
Adverb Clauses/ 100 T-units	21.	29.01
Adjective Clauses/ 100 T-units	16.	31.61

*Based on O'Hare (1973), p. 56.

Furthermore, the post-treatment compositions of the experimental group were judged to be significantly better in overall quality than those of the control group. Thus O'Hare claimed that grammar-free sentence combining was an effective means for enhancing the syntactic fluency and writing quality of his students.

Conclusions

In the final chapter of his report, O'Hare identified further implications for sentence combining as an aid to composition instruction. Despite Mellon's claims to the contrary, O'Hare stated that sentence combining has definite stylistic implications because it provides the writer with "an expanded practical repertoire of syntactic choices" (O'Hare, 1973, p. 70). Thus the student is more likely to employ a greater variety of sentence structures, thereby avoiding the monotonous, plodding style that is so characteristic of immature writing.

O'Hare also suggested that sentence combining may have a positive effect on students' ability to generate content. In an admittedly subjective comparison of the two groups' writing, O'Hare found that the experimental group's compositions seemed to have more detail and development than those of the control group. O'Hare speculated that as the experimental students became more confident in their syntactic fluency, they were better able to turn their attention to semantic and rhetorical considerations in their writing.

Finally, O'Hare outlined several pedagogical implications for sentence combining. He suggested that oral sentence-combining activities could begin as early as the second grade, with written exercises introduced in the third or fourth grade. Since his cuing system was so adaptable, O'Hare

also claimed that exercises incorporating even more sophisticated syntactic structures could be developed for junior and senior high students. Moreover, O'Hare noted that the elimination of grammar study from the sentence-combining curriculum contributed to the synthesis of syntactic and stylistic fluency:

> With the threat of grammatical failure removed, the developing writer can get on with solving sentence-structure problems and confidently face the real issue--that of blending form and ideas in any given rhetorical situation (O'Hare, 1973, p. 76).

Criticism of the O'Hare Study

In a recent conference paper, John Mellon (1979) discussed O'Hare's 1973 experiment. Although O'Hare had emphasized the differences between his study and Mellon's earlier work (1969), Mellon called these differences "inconsequential as regards the empirical aspects of his study" (Mellon, 1979, p. 6). O'Hare had faulted Mellon for including his sentence-combining practice in a transformational grammar course. Mellon, however, reiterated that the study of transformational grammar was in no way responsible for the gains in syntactic fluency achieved by his experimental students:

> I simply never dreamed that readers of my report might be so careless as to conclude, in direct contradiction of its stated hypothesis, that the design of my experiment conflates the effect of grammar study and that of sentence-combining practice. Yet this is exactly the misinterpretation popularized by Frank O'Hare (1973) and repeated by others. Such is the power of grammar, that persons take leave of their senses upon the mere mention of the word (Mellon, 1979, p. 5).

However, Mellon did recognize the value of O'Hare's sentence-combining cues as a simplification of the learning task involved in the exercises. Furthermore, he praised O'Hare's work for its important pedagogical contributions:

> . . . O'Hare quickened the consciousness of America's English teachers to the potentialities of sentence combining in a way the Mellon study never would have done. And for that we stand in his debt (Mellon, 1979, p. 7).

A more serious criticism of O'Hare's study, though, was Robert Marzano's article, "The Sentence Combining Myth" (1976). Marzano challenged O'Hare's method of rating overall quality, pointing out that "O'Hare's forced-choice method inappropriately measures a trait that exists on a continuum (poor overall quality -- good overall quality) in a yes--no fashion" (Marzano, 1976, p. 58). He further suggested that O'Hare's rating system might have produced misleading results:

> For example, consider the possibility that with one pair of compositions, the experimental group composition was slightly better than the control group composition . . . . For a second pair the control group composition could have been far superior to the experimental . . . . When considered together these two pairs of compositions give the false impression of a tie in overall quality (one plus for each group) when in actuality the two control compositions possess more collective quality than the two experimental compositions (Marzano, 1976, pp. 57-58).

Marzano also cited a study of his own in which he found that syntactic fluency accounted for only 25% of the variance in overall quality in a set of 100 compositions. Based on these findings, Marzano concluded that "the most generous statement one can make concerning sentence combining practice is that is might improve overall quality but only to a certain point" (Marzano, 1976, p. 59).

According to Mellon (1979), however, Marzano's criticism of O'Hare's forced-choice rating method was little more than "a mathematical quibble . . . an issue of importance only if one is concerned about the possible occurrence of extremely improbable events" (p. 15). Furthermore, Mellon emphasized that the syntactic gains achieved through sentence-combining practice have never

been represented as the single most important factor accounting for improvement in writing quality. However, even Marzano's 25% correlation figure suggests that syntax is certainly one of the significant factors influencing writing quality.

John Perron

An Exploratory Approach to Extending the Syntactic Development of Fourth-Grade Students
1974

During the 1973-74 academic year, John Perron conducted a sentence-combining experiment with fourth-grade students in a northern California public school. Both Mellon (1969) and O'Hare (1973) had suggested that sentence-combining practice would be effective in the elementary grades, as well as in junior high school. Furthermore, earlier studies by Miller and Ney (1968) and Hunt and O'Donnell (1970) had indicated that sentence combining was an effective strategy for enhancing the syntactic fluency of fourth-graders.

Perron, however, was concerned with the appropriateness of the instructional methods employed in these earlier studies. James Moffett (1968) had criticized Mellon's curriculum because the exercises were presented out of context. That is, students were required to manipulate "dummy" sentences for no purpose other than completing the problem. Moffett claimed that if students were genuinely motivated to solve the sentence-combining problems, they would more likely benefit from the experience. Thus, Perron sought to overcome Moffett's concerns in his experimental curriculum:

> The initial instructional method used to introduce sentence combining has been the flat, workbook approach. But the addition of games, activities, and experiential exercises can place syntactic insights on a more concrete level for younger children (Perron, 1976, p. 655).

Perron's curriculum included structured and semi-structured exercises emphasizing the game-like quality of sentence-combining problems. The structured exercises consisted of 30 lessons (using O'Hare's [1973] cuing system) featuring stories, informative articles, humorous sentences, and "name-dropping" problems, which used the actual names of students in the class, e.g.:

> Roscoe, Todd, and Scott think SOMETHING.
> Some lessons are weird. (THAT)
> They talk about all the people in their room! (BECAUSE)
> (Perron, 1974, p. 229)

On alternate days, students also participated in semi-structured sentence-combining games and activities outside the regular classroom.

Experimental Design

Thirty-two students from Mountain View Elementary School participated in Perron's research. Eighteen students were assigned to the experimental group, which followed the program described above. Fourteen students comprised the control group, which followed a language arts curriculum featuring abundant free writing assignments. The control group also participated in games and experiential activities, but these were not related to sentence combining. Neither group studied formal grammar. Pre- and post-treatment writing samples, covering the narrative, descriptive, expository, and argumentative modes, were collected from all students. Perron analyzed the writing on six factors of syntactic fluency: words/T-unit, clauses/T-unit, words/clause, and noun, adjective, and adverb

clauses per 100 T-units. Overall writing quality evaluations were determined by three raters using the matched-pair method designed by O'Hare (1973). Unlike previous studies, however, Perron's raters also compared the overall quality of the pre-treatment essays of the two groups to ensure that neither group had an advantage at the outset of instruction.

Results

A T-unit analysis of the experimental group's pre- and post-treatment compositions revealed that the group had made significant gains on five of the six factors of syntactic fluency, while the sixth measure, noun clauses/100 T-units, approached statistical significance. The control group made gains on two of the six factors, words/T-unit and noun clauses/T-unit.

In comparing the two groups' gains, however, Perron found that there was no statistically significant difference between the groups. He suggested that the small size of the sample may have influenced this result. Nevertheless, when Perron compared the gains on a percentage basis (using the control group's gains as the base for each factor), he found that the experimental group achieved consistently higher gains. These results are summarized below:

Table 7*

Factors	Experimental Group's Gain Over Control Group
Words/T-unit	71%
Clauses/T-unit	64%
Words/Clause	78%
Noun clauses/100 T-units	2%
Adjective clauses/100 T-units	644%
Adverb clauses/100 T-units	8%

*Based on Perron, 1974, p. 159.

Perron also compared his results with the normative data established by Hunt (1965) and O'Hare (1973). He found that although the experimental group began the program below grade level in five of the six factors, at post-treatment they were above grade level in every factor except noun clauses. The control group began below grade level in four factors of syntactic fluency; at post-treatment, they were above grade level in these four factors.

The evaluation of overall writing quality revealed that both groups began the instructional program with essentially the same degree of writing competence. Furthermore, each group made significant gains in writing quality when pre-treatment compositions were compared with post-treatment samples. However, when the post-treatment papers of the experimental group were compared to those of the control group in the matched-pair format, there was no significant difference between the two groups. That is, raters tended to choose the writing of the control group as frequently as they did that of the experimental group.

Conclusions and Implications

Perron concluded from his data that both the experimental and control curricula did enhance syntactic fluency and overall writing quality. Sentence combining seemed to be the more effective strategy for teaching sentence structure, but both treatments had an equally positive effect on writing quality. These results, Perron claimed, indicated that a curriculum incorporating both free writing and sentence combining would be the most advantageous method.

Drawing upon these conclusions, Perron suggested that "sentence-combining has been an exciting addition to the language arts curriculum for encouraging syntactic gains in students" (1976, p. 655). The structured,

individualized lessons were successful not only in enhancing syntactic growth, but also in motivating students. The O'Hare system of cuing was easy for young students to grasp, and they seemed to enjoy working with stories, humorous sentences, and the problems that used students' names. The teachers who participated in the experiment claimed that once the students understood the embedding procedures, they had little trouble handling the syntactic manipulation.

The semi-structured games and activities used in the Perron experimental curriculum were particularly useful in stimulating discussions and arguments on the relative merits of various syntactic operations. Critics of sentence combining had complained that growth in syntactic fluency was often attributable to "the underlying message that the complex sentences being taught should be adopted if the students wanted to succeed in school" (Perron, 1974, p. 170). However, Perron noted that the sentence-combining games were designed to counter these arguments:

> . . . this study tried to anticipate such criticism by including in the design the semi-structured portion. The natural conversation and discussion that took place over the manipulation of sentences in games and activities involved the students in efforts to prove a point, win a game, or support a teammate's meaning or usage of language--but seldom to succeed in school (1974, p. 171).

Perron also found that the sentence-combining games that did not involve writing out answers were most successful. Although students did not mind writing the answers to problems in the structured lessons, they much preferred oral activities in games.

The question of sentence combining's effect on overall writing quality, however, was not clarified in the Perron experiment. Perron's was the third study to investigate this question, but he found that his

results added "more confusion than clarity . . . to the issue" (1974, p. 171). Mellon (1969) reported that his experimental group was judged to be inferior to the control group in writing quality. On the other hand, O'Hare (1973) found that his experimental students were judged significantly better in overall quality than the control students. Although both groups in the Perron study significantly improved the quality of their writing over the course of the year, raters found that the improvement was about the same. Thus Perron concluded that "the question of whether sentence combining influences quality gains in writing remains in doubt." (1974, p. 172).

Warren Combs

Some Further Effects of Sentence-Combining Practice on Writing Ability
1976

Warren Combs' sentence-combining experiment was essentially a replication of Mellon's (1969) and O'Hare's (1973) earlier work with seventh-graders. A significant contribution of the Combs study, though, was its investigation of the durability of syntactic gains achieved as a result of sentence-combining practice. Both Hunt (1970) and Ney (1974) had suggested that gains in syntactic maturity were "psychologically real" (Combs, 1976, p. 138) because they resulted from gains in cognitive processing abilities. Thus Combs designed his experiment to test three major hypotheses:

1. Syntactic maturity gains achieved by the Mellon and O'Hare procedures are replicable with a seventh-grade population.

2. Syntactic maturity gains are retained as measured by a delayed post-test of students' free writing.

3. The overall "quality" of writing of students receiving SC [sentence combining] practice will be judged superior to that of students not receiving SC practice as measured by an expanded matched-pairs design (Combs, 1976, p. 138).

Experimental Design

Combs' sample population consisted of 100 students attending a suburban Minneapolis junior high school. Students were assigned to two experimental and two control classes. Both groups followed a similar course of study, except that the experimental curriculum included 14 sentence-combining lessons employing O'Hare's (1973) cuing system. Neither the experimental nor the control group studied formal grammar. Two writing samples (one narrative and one descriptive) were collected from each student at three intervals: (1) prior to the beginning of instruction, (2) immediately following the course, and (3) eight weeks after the conclusion of the course.

Combs performed a T-unit analysis on 300-word writing samples, generally following the procedures used by O'Hare (1973). Unlike earlier researchers, however, Combs relied on only two factors of syntactic maturity, words per T-unit and words per clause. Although Mellon had calculated twelve separate indices of syntactic fluency, and O'Hare had analyzed six, Combs limited his analysis to these two measures because they had been shown by Hunt (1965, 1970) to be the most reliable predictors of syntactic growth.

Results

Combs' experiment proved his three major hypotheses. T-unit analyses revealed that the experimental group had achieved syntactic gains that

were significantly higher than the control group's progress. However, Combs' results were closer to Mellon's (1969) figures than they were to O'Hare's (1973), particularly in words per T-unit, the best index of syntactic maturity. Table 8 compares the three studies on this index:

Table 8*

Comparison of Words per T-Unit: Experimental Groups of the Mellon, O'Hare, and Combs Studies

Study	Pre-test	Post-test	Change
Mellon (1969)	9.98	11.25	1.27
O'Hare (1973)	9.63	15.75	6.12
Combs (1976)	9.48	11.65	2.17

In analyzing the writing samples of the two groups eight weeks after the conclusion of instruction, Combs found that the experimental group still scored significantly higher than the control group. However, the gains of the experimental group had eroded considerably; in words per T-unit, the gain had slipped by nearly half.

Combs' third hypothesis was validated in an overall quality rating performed by seven judges. Using the matched-pair design developed in the O'Hare study (1973), the raters chose the post-treatment writing samples of the experimental group significantly more than they did those of the control group. This pattern was not evident in a similar evaluation of the two groups' pre-treatment writing samples, suggesting that the groups were of approximately equal ability before the experiment began.

Conclusions and Implications

Combs claimed that sentence combining did in fact enhance the syntactic fluency and overall writing quality of his experimental students.

*Based on Combs, 1976, p. 143.

Thus his experiment supported the findings of Mellon and O'Hare. However, Combs questioned O'Hare's contention that grammar-free instruction alone was responsible for the dramatic differences between the gains of O'Hare's and Mellon's students. Generally, Mellon's students had exhibited a syntactic growth rate of approximately two years, while O'Hare's students had achieved a growth rate four to five years beyond what would normally be expected. O'Hare had attributed much of this success to the grammar-free context of his sentence-combining exercises. Since Comb's results more closely resembled Mellon's, though, Combs concluded that "direct instruction in grammar is only one of numerous intervening variables that bear on the results of SC practice" (1976, p. 147). However, Combs admitted that the discrepancy between his results and O'Hare's was "less important than the consistent finding of significant differences, establishing quite conclusively the effect of SC practice "(1976, p. 147).

The results of the overall quality ratings also pointed out the effectiveness of sentence-combining practice. Combs noted that his results were especially significant in light of the criticism of sentence combining expressed by several authorities:

> Skepticism about SC practice (Christensen, 1968; Moffett, 1968; Cazden, 1972) derives from a belief that syntactic manipulation encourages over-complicated, badly-conceived prose. Unless one is willing to entertain the counter-intuitive assumption that such prose is consistently preferred by teacher-raters, the present study shows that students in the experimental group wrote sentences of improved "quality" (1976, p. 148).

Although sentence combining was proven effective in enhancing syntactic growth and writing quality, Combs claimed that his findings on the persistence of syntactic gains warranted some attention:

> Gains achieved at post-test erode to about half their magnitude (in W/TU) after eight weeks without formal practice. Accordingly, the gains reported by earlier SC studies, impressive as they are, must be accepted with cautious regard (1976, p. 148).

Nevertheless, Combs was convinced that sentence combining was a valuable addition to language arts instruction.

Jose Burruel, Julie Gomez, and James Ney

Transformational Sentence Combining in a Barrio School
1975

Burruel, Gomez, and Ney (1975) replicated an earlier study by Miller and Ney (1968) with fourth-grade bilingual students in an Arizona elementary school. The experimenters sought to determine whether bilingual students would benefit from sentence-combining practice in the same way that Miller and Ney's monolingual students had.

Experimental Design

Generally, Burruel et al. followed Miller and Ney's instructional method in their experimental curriculum. First, students participated in a brief choral reading. Next, they orally practiced sentence-combining models developed from the reading text. Students then practiced several additional problems orally before proceeding to written exercises. The exercises covered 16 separate sentence types, including adjective embeddings, relative clause tranformations, and adverbial and nominal embeddings. Overall, students performed very well on the exercises, producing the desired results with very low error rates. However, the experimenters found that some sentence-combining processes "proved highly resistant to improvement" (Burruel et al., 1975, p. 220). For example, the embedding

of conjoined adjectives (e.g., "He saw the young and silly rabbit" [Burruel et al., 1975, p. 222]) was particularly difficult for students, yielding a 50% error rate over four successive lessons. The experimenters suggested that "such phenomena seem to support the nativistic claims of Chomsky; children tend not to be able to perform linguistic operations which are beyond their stage of development" (1975, p. 220).

Pre- and post-treatment writing samples were collected from students in the experimental and control groups. The stimulus for the writing was a short film containing no dialogue. Students were simply told to write about what they had seen. Thus the elicited response was a brief narrative/descriptive paragraph. Interestingly enough, the same film was used as the writing stimulus for both the pre- and post-test. Although one would suspect that the students' familiarity with the subject matter of the stimulus might have influenced the post-treatment writing samples, the experimenters did not discuss this implication.

As noted earlier, this study was essentially a replication of the Miller and Ney experiment. However, there were two differences in the experimental methods. First, the control group of Burruel et al. received some sentence-combining instruction in embedding pre-nominal adjectives; e.g.:

1. The rabbit was thinking about clover.
2. The rabbit was happy.
3. The happy rabbit was thinking about clover. (Burruel et al., 1975, p. 219)

The experimental group also practiced these adjective embeddings, but their curriculum included other more complex structures (e.g., relative clause embeddings) that were not studied by the control group. In the

Miller and Ney experiment, the control group received no sentence-combining practice.

The second difference between the two studies was that the bilingual students were rewarded with small monetary prizes (five or ten cents) for completing the sentence-combining problems. Miller and Ney did not use this motivational technique.

Results

Generally, Burruel, Gomez, and Ney's findings paralleled those of Miller and Ney (1968). The experimental group wrote longer compositions at post-test, they wrote more multi-clause T-units than did the control students, and they tended to use more of the structures they had practiced than did the control students. There was no significant difference in the frequency of pre-nominal adjectives between the groups. Since this was the one structure practiced by both the experimental and control groups, the experimenters concluded that the full sentence-combining curriculum was solely responsible for the gains of the experimental group.

Burruel et al. also compared the gains of their experimental students with Miller and Ney's (1968) results, generally finding the two groups to be similar:

> It is thus gratifying to see that bilingual children are not handicapped in the language arts class when they are given appropriate instruction. They are just as responsive as other students to this instruction (Burruel et al., p. 228).

In addition, the experimenters performed an analysis of the vocabulary enrichment derived from the sentence-combining practice. A "type/token" ratio was calculated for the experimental and control groups. This measure is essentially a count of lexical repetition; i.e., fewer occurrences of

the same word yield a "good" score. The results of this analysis favored the control group, but the differences were so slight that they signified "little or nothing" (Burruel et al., 1975, p. 229). The experimenters found, though, that the type/token ratio had two major limitations. First, the measurement tended to penalize students who wrote longer compositions:

> A student can write only 13 words, as one student did, and repeat one of the words only once for a type/token ratio of 13:1, a very good score. (Only nouns, verbs, adjectives and adverbs were counted in this type/token ratio.) But if a student writes 125 words it is extremely unlikely that many of the counted words will not be repeated (Burruel et al., 1975, p. 229).

Secondly, the type/token ratio also penalized students who used repetition for literary effect (e.g., "The leaf floated down, down, down" [Burruel et al., 1975, p. 229]).

Conclusions and Implications

While concluding that sentence combining was an effective strategy for improving student writing in their experiment, Burruel, Gomez, and Ney cautioned that there may be some drawbacks in using sentence combining with younger students. Two of the experimental students produced "mostly garbles or malformed sentences on the post-test" (Burruel et al., 1975, p. 230), suggesting that the students assumed that they were to use exclusively those structures that had been practiced in the sentence-combining exercises. However, these two students were in no way typical of the experimental population. In speculating on the reasons for the success of sentence combining in their study, Burruel et al. offered the following suggestions:

> It may be that the simple act of listening to sentences, processing them and then writing them down facilitates the overall writing process for students. It may be that reading chorally and then practicing with the language of the choral reading gives the student a certain

> familiarity with the written language and with the process of composition. Whatever it is about these exercises that helps students improve their writing, this much is certain: they do help students mature linguistically and thus improve their writing (Burruel et al., 1975, p. 230).

James Ney

The Hazards of the Course
1976

Experimental Design

James Ney's (1976) study at Arizona State University was the first attempt to measure the effectiveness of sentence-combining practice with college freshmen. However, the Ney experiment was also the first major sentence-combining study yielding negative results. Three freshmen composition classes participated in the experiment during the spring semester of 1974. Students were assigned to three groups, one control and two separate experimental groups. The control group studied no sentence combining at all, but Ney does not specify what the control curriculum did include.

The first experimental group, the "composition" section, practiced sentence-combining exercises that included detailed instructions couched in grammatical terminology. The exercises were developed from the writing of professional authors and generally included as models the cumulative sentences advocated by Christensen (1967, 1968b). The following problem illustrates the format of the composition-group exercises.

1) a. Throughout that winter the gales blew.
   b. Hook flew for hours.
   c. Hook was tired and hungry in the chilled air.
   d. Hook was searching for small game in the blanched grasses.
   e. Hook saw gophers.
   f. The gophers were frightened.
   g. The gophers were plunging into their tunnels beneath the matted turf.

2) Conjoin sentences (a) and (b) with and; delete subject (Hook) and be (was) from sentences (c) and (d) and embed them to sentence (b).

3) Insert adjective from (f) into (e), embed (g) to (e); then, delete the subject and be.

4) Conjoin the sentence at (3) with the sentence at (2); delete the subject and be. (Ney, 1976, p. 73)

Following Ney's step-by-step instructions, the student was to produce the following sentence taken from a short story by Walter Van Tillburg Clark:

> Throughout the [sic] winter the gales blew, and Hook flew for hours, tired and hungry in the chilled air, searching for small game in the blanched grasses, and saw frightened gophers, plunging into their tunnels beneath the matted turf (Ney, 1976, p. 73).

The third segment of Ney's student population, the "decomposition-recomposition" group, practiced breaking down long sentences into their constituent elements. For example, the group was presented with Van Tillburg Clark's complete sentence and was told to "decompose" it into the smaller sentences noted in (1) above. The students then "recomposed" another sentence following the same pattern as the one they had broken down. Unlike the composition group, however, the decomposition-recomposition group did not receive detailed instructions for the embedding processes.

Students in both sentence-combining groups were given approximately ten minutes in each class period to complete an exercise. Thus the experimental curriculum accounted for about four and one-half hours of instruction within the 27-hour composition course. (Ney also noted that no oral practice was used with the exercises.) Each of the daily exercises was checked by the instructor and was "graded excellent if the student reproduced the original exactly; good, if the student created a grammatical sentence on the basis of the original and fair, if the student produced sentence errors such as run-on sentences" (Ney, 1976, p. 74).

Results

In order to test the effectiveness of the experimental treatments, Ney collected pre- and post-test writing samples from all three groups. Following Hunt's (1965, 1970) procedures for T-unit analysis, he counted and compared 26 separate syntactic structures. After comparing the performances of the three groups, Ney was disturbed to find that the only significant differences were negative results in the writing of the decomposition-recomposition group; i.e., on the post-test, this group used fewer of the practiced structures than they had on the pre-test:

> This is disturbing because the experimental groups had practiced, for an entire semester, writing cumulative sentences. In other words, the control which did not practice such sentences showed small gains, although the gains were not statistically significant; the composition group showed similar gains, although these gains were not significantly different from those of the control group; but the decomposition-recomposition group showed a noticeable decline in the use of structures which are used in the writing of cumulative sentences from pretest to posttest. (Ney, 1976, p. 75).

In his attempt to explain the failure of his experiment, Ney suggested several factors that may have contributed to the results. First, he postulated that the mechanical nature of the exercises may have bored the students. In an attitudinal survey administered at the conclusion of the course, both experimental groups expressed less than positive attitudes toward the sentence-combining practice. Furthermore, Ney suggested that the absence of any oral practice may have made the exercises unnecessarily difficult. The decomposition-recomposition group, in particular, "experienced so much failure in the day-to-day exercises that they regressed in their ability to use the sentence types practiced" (Ney, 1976, p. 75). finally, Ney indicated that "freshmen students may simply be past the stage when such exercises are of benefit" (Ney, 1976, p. 76).

Criticism of the Ney Study

In a subsequent report on a successful college sentence-combining experiment, Daiker, Kerek, and Morenberg (1978) challenged the results of Ney's experiment as "misleading and irrelevant" (Daiker et al., 1978, p. 36). Daiker et al. pointed out several methodological flaws of the Ney study, the most important being the relatively small amount of time spent on sentence combining in the composition course. Previous studies by Mellon (1969), O'Hare (1973), and Combs (1976) had devoted twenty or more hours of class time to sentence combining in their experimental curricula, all with positive results. Ney's students, however, spent less than five hours practicing sentence combining. Thus Daiker et al. asked, "Isn't it . . . plausible that a mere four and one-half hours of training in sentence-combining will fail to produce positive results on any academic level?" (1978, p. 37)

Daiker et al. also questioned the "general carelessness" (1978, p. 37) of Ney's experiment. In his report, Ney does not describe the size or comparability of his student population, nor does he explain how the teacher variable was controlled. An even more serious flaw, Daiker et al. pointed out, was Ney's failure to describe the nature of his pre- and post-treatment writing samples.

Such deficiencies in experimental methodology also clouded the one conclusion of Ney's study that is compatible with past research in sentence combining. According to Daiker et al., the negative results found in the writing of Ney's decomposition-recomposition group should have been expected because the practice of breaking down complex sentences into shorter elements "seems designed to foster the kind of writing that,

according to Hunt's syntactic maturity scale, would be rated immature" (1978, p. 37). Moreover, such "decomposing" exercises are the very antithesis of writing, a point previously made by several authorities:

> Mellon, O'Hare, Strong, Cooper, Combs--all emphasize in their exercises the synthetic process of putting together rather than the analytic process of taking apart. Composition, as its name implies, is an act of synthesis, not analysis (Daiker et al., 1978, p. 38).

The results of Ney's attitudinal survey were also discussed by Daiker, Kerek, Morenberg (1968). Ney had suggested that sentence-combining, per se, might be "of no inherent interest" (Ney, 1976, p. 75) to older students. However, Daiker et al. speculated that Ney's particular brand of sentence combining may have fostered negative attitudes. They pointed out that a mere ten minutes of practice time per day might have been frustrating for students. In addition, the instructors may have been less than enthusiastic about sentence combining from the beginning. More importantly, though, "the unnecessarily elaborate instructions which accompanied Ney's sentence-combining exercises [perhaps] discouraged students" (Daiker et al., 1978). And finally, Daiker et al. suggested that the use of signalled exercises, for which there is only one correct answer, may have stifled the creativity of Ney's college freshmen.

Donald Daiker, Andrew Kerek, Max Morenberg

Sentence Combining at the College Level
1978

Encouraged by the results of earlier sentence-combining studies in the elementary and secondary levels (e.g., O'Hare, 1973; Combs, 1976; Miller and Ney, 1968), Daiker, Kerek, and Morenberg designed an experiment to study the effectiveness of sentence combining with college freshmen at

Miami University in Oxford, Ohio. Although Ney (1976) had suggested that sentence combining might have limited value for college students, the Miami experimenters were convinced that the poor design of Ney's curriculum had caused his discouraging results. Thus, in the fall semester of 1976, Daiker et al. sought to determine whether an intensive program of sentence combining would in fact enhance the syntactic fluency and overall writing quality of college freshmen.

Experimental Design

Twelve sections of the basic freshman composition course comprised the experimental population. A total of 290 students were randomly assigned to six control and six experimental classes. There were no significant differences between the two groups on standardized test scores. The instructors of the twelve classes were matched on the basis of academic rank, experience, and teaching effectiveness. Thus neither group held any advantage at the outset of the study.

The control group followed the standard course outline for freshman composition at Miami University. The curriculum included rhetoric study, analysis of model essays, and discussions of student compositions. During the course of the semester, students were assigned eight separate writing assignments, including the pre- and post-treatment writing samples required by the experiment.

The experimental group received intensive sentence-combining practice using William Strong's textbook, Sentence Combining: A Composing Book (1973), supplemented by exercises developed by the experimenters. Unlike

earlier sentence-combining studies, however, Daiker et al. did not include other instructional strategies in their sentence-combining curriculum:

> In the present study, SC [sentence combining] was the course. The experimental group consisted of genuine SC classes where students approached all questions of writing--rhetorical as well as syntactic and stylistic--exclusively through exercises calling for the judicious manipulation and synthesis of sentences (Kerek et al., 1979, p. 82).

The exercises included "open" format problems, for which no specific embedding instructions were used, and "semi-open" problems, which were patterned after model sentences. In both cases, the use of grammatical terminology was kept to a minimum. The model below illustrates the format of Strong's semi-open exercises:

1. The driver wheeled his van.
2. The wheeling was into the lot.
3. The lot was for trucks.
4. The driver squinted against the sun.
5. The sun was afternoon.
6. The driver checked his mirror.
7. The mirror was rearview.

Solution: The driver wheeled his van into the truck lot, squinting against the afternoon sun, checking his rearview mirror (Strong, 1973, p. 164).

The main clause is underlined (italicized in the original text), and the following kernel sentences are either embedded into a sentence above or added as free modifiers following the main clause. The resulting solution is an example of the cumulative sentence described by Christensen (1967, 1968b).

In addition to these patterned syntactic exercises, the experimenters also provided supplementary sentence-combining problems designed to stimulate students' interest in broader aspects of composition, such as tone, coherence, and diction. For example, in a recently published textbook

based on the Miami University study, Daiker et al. include the following exercise, which deals with the problem of establishing and controlling tone:

> Read over the following sentences in order to decide on the tone you want to create. Then combine the sentences into an essay with a clearly defined tone. You may change words or phrases and add or eliminate details.
>
> Aren't You Glad You Use Dial?
>
> 1. Americans have always lived by aphorisms.
>
> 2. Ben Franklin's Poor Richard became famous for teaching us this.
> 3. "A penny saved is a penny earned."
> 4. "Hard work never hurt anyone."
>
> 5. We believed the aphorisms.
> 6. And we became a great nation.
> 7. We saved our money.
> 8. And we worked hard.
>
> 9. But there is one aphorism.
> 10. We took to it more than the others.
> 11. It is "cleanliness is next to godliness."
>
> 12. So we made a fetish out of keeping clean. (Daiker et al., 1979b, pp. 314-315*)

Like the control group, the experimental students also completed eight writing assignments during the semester. The pre- and post-treatment writing samples of both groups were expository compositions that also "lent themselves to narrative and descriptive detail" (Kerek et al., 1979, p. 83).

The writing samples of both groups were analyzed on three factors of syntactic fluency: words per clause, words per T-unit, and clauses per T-unit. In addition, overall writing quality was rated by a team of 28 experienced composition teachers. Post-treatment compositions were subjected to three separate evaluations. First was a holistic, "general

---

*Only part of the exercise is illustrated here. In the original text, the problem consists of 49 separate kernel sentences.

impression" rating similar to that employed by Mellon (1969). Second, each paper was scored analytically on six separate categories: ideas, supporting details, organization and coherence, voice, sentence structure, and diction and usage. Finally, 134 matched pairs of control and experimental compositions were rated by the forced-choice method developed by O'Hare (1973).

Results

In a T-unit analysis of pre- and post-treatment compositions, Daiker et al. found that both groups were comparable at the beginning of the study. At post-test, however, the experimental group showed significantly higher gains in words per T-unit and words per clause, the latter being the most reliable index of syntactic maturity for older writers, according to Hunt (1965). In clauses per T-unit (the subordination ratio), there was no statistically significant difference between the groups. However, Hunt had indicated that the subordination ratio remains fairly constant after the twelfth grade. Thus the Miami experimenters concluded:

> The growth, then, is precisely in the direction that Hunt leads us to expect--a relatively stable subordination ratio (the index in which at about this age a young writer's development has just about reached the ceiling set by the language), and a vastly exploding clause size, which also jacks up T-unit size, as students learn to add details and hence substance to their sentences (Kerek et al., 1979, p. 85).

The ratings of overall writing quality also revealed positive results. In the holistic evaluations, the experimental group received significantly higher ratings than did the control group. In the forced-choice test, the compositions of the experimental group were selected at a ratio of almost two to one. Again this result was statistically significant. Examination

of the analytic scores showed that the experimental group was rated consistently higher on five of the six criteria. Organization/coherence was the only category in which the experimental group did not enjoy a clear-cut advantage; however, even in this category the experimental group was not found to be inferior to the control group. In comparing the results of the two groups, the experimenters noted:

> . . . not only did those qualities stressed in the SC class--sentence structure, supporting materials, and voice--appreciably raise the general effectiveness of writing; sentence combiners significantly outgained control students even in the one quality most cultivated in the conventional class--ideas (Kerek et al., 1979, p. 85).

Two other secondary findings of the Miami University experiment deserve mention. First, a comparison of scores on a standardized reading test revealed no significant differences between the two groups, although the experimental group did achieve a higher composite post-test score. Second, in an attitudinal survey completed at the conclusion of the study, experimental students indicated overwhelmingly positive attitudes toward sentence combining. This result contradicted Ney's (1976) suggestion that sentence combining might be too mechanical for older students.

Conclusions

Citing the success of their experiment, Daiker, Kerek, and Morenberg concluded that sentence combining could indeed serve as the basis for a complete freshman composition course. According to the experimenters, sentence combining need not be restricted to simple, mechanical exercises in syntactic manipulation:

> We found, in fact, that you can effectively and pleasantly put across just about any aspect of writing by discussing SC options--thesis, organization, coherence, emphasis, tone, rhythm, problems of grammar and punctuation as they arise, even diction (Kerek et al., 1979, p. 82).

Moreover, the use of open and semi-open exercises reduced the emphasis on grammatical terminology and eliminated the need for contrived embedding cues (cf. O'Hare, 1973). Thus students were free "to weigh the syntactic, stylistic, and rhetorical consequences of given options" (Kerek et al., p. 82).

The rhetorical emphasis of the Miami sentence-combining curriculum may have also contributed to the gains in writing quality achieved by the experimental group. But what the experimenters could not definitively establish was why sentence combining had such a positive effect. Critics of sentence combining (e.g., Marzano, 1976) had questioned whether increased growth in syntactic maturity was directly responsible for gains in overall writing quality. Although mature syntax is highly correlated with writing quality, correlation does not necessarily establish causation. While granting this point, the Miami experimenters speculated on some possible side-effects of sentence-combining practice:

> Does SC tap some deep cognitive skills, enhancing their growth? Or are the benefits primarily psychological--perhaps increased control over the available linguistic choices simply makes writers feel more confident, giving them the incentive and the courage to use their growing repertoire of options in novel and interesting ways? Perhaps the increased control over form does encourage invention and help generate ideas . . . (Kerek et al., 1979, p. 86).

In any event, Daiker, Kerek, and Morenberg concluded that sentence combining practice with college freshmen can have positive effects on the growth of syntactic fluency and can, at the same time, lead to an improvement in overall writing quality.

Murray F. Stewart

Freshman Sentence Combining: A Canadian Project
1978

Murray Stewart's research at the University of New Brunswick was the third major study designed to test the effect of sentence-combining practice on the writing of college freshmen. Although Ney's (1976) sentence-combining curriculum had been largely unsuccessful at Arizona State University, Daiker et al. (1978) had provided evidence that sentence combining was indeed an effective strategy for enhancing the syntactic fluency of college writers. Stewart saw in sentence combining an attractive method for achieving rapid gains in syntactic capabilities. This was particularly important for the Canadian project because Stewart's freshmen were enrolled in a brief, six-week, 18-hour communications course. Studies by Vitale et al. (1971) and Perron (1974) had pointed to the value of short, intensive sentence-combining practice with younger students. Stewart hoped that similar results could be obtained with college writers.

Stewart's sentence-combining curriculum was based on William Strong's Sentence Combining: A Composing Book (1973), supplemented by exercises featuring the Christensen (1967, 1968a, 1968b) model of the cumulative sentence. These instructional materials had been trial-tested by Stewart in 1976 and 1977 with positive results. Thus he designed his 1978 study to test the following hypotheses:

1) Students exposed to sentence combining would achieve significantly higher gains than a control group on two indices of syntactic maturity, words per T-unit and words per clause. These two measures had been shown to be the most reliable predictors of maturity for older students (O'Donnell, 1976). Words per T-unit and words per clause would be calculated for two separate writing tasks. First was the Syntactic

Maturity Test* (a controlled writing task) developed by O'Donnell and reported in Hunt (1979); second was a 300-word free writing sample.

2) The free writing samples of the sentence-combining group would not be judged inferior to the control group's samples in a holistic evaluation of writing quality.

Experimental Design

During three 6-week periods, Stewart taught eight sections of the basic communications course. The experimental population consisted of 160 students randomly assigned to either the "treatment" (experimental) or "reference" (control) group. Both groups were shown to be comparable at the outset of the experiment. The treatment group received intensive instruction in the Strong-Christensen sentence-combining materials. The reference group concentrated on expository writing--selecting topics, developing theses, gathering information, drafting, discussing, and revising. In both groups, grammatical terminology was avoided.

At pre- and post-test, both groups completed the O'Donnell-Hunt Syntactic Maturity Test, which requires the student to rewrite a paragraph consisting of short kernel sentences. In addition, each student contributed a 300-word free writing sample. The compositions of thirty students from each group were randomly selected for T-unit analysis following the procedures described by Hunt (1970) and O'Hare (1973). The free writing samples were also subjected to an overall quality evaluation. Three judges, who had been trained by Educational Testing Service, rated the compositions on a four-point holistic scale. The sample papers were typed, with spelling and punctuation corrected.

*See the "Aluminum" paragraph on pp. 7-8 of this paper.

Results

T-unit analyses of both the controlled writing tasks and the free writing samples revealed no significant difference between the groups at pre-test. At post-test, however, the treatment group was significantly higher in words per T-unit and words per clause. Thus Stewart's first hypothesis was confirmed. Moreover, the gains of the treatment group compared favorably with those of O'Hare's (1973) experimental group, which had received eight months of sentence-combining instruction. A comparison of Stewart's results with those of Daiker et al. (1978) showed Stewart's treatment group to be consistently higher on both indices of syntactic maturity.

The results of the writing quality evaluations confirmed Stewart's second hypothesis. The average holistic score for the treatment group was higher than the reference group, although the difference between the groups was not statistically significant. Nevertheless, the compositions of the treatment group were clearly not judged inferior to those of the reference group.

Conclusions

Stewart concluded that his intensive, six-week sentence-combining curriculum had been successful in enhancing the syntactic capabilities of his students. Furthermore, the gains in syntactic fluency were not obtained at the expense of writing quality:

> In sum, the results support the proposition that freshmen can take a six-week module of grammar-free sentence-combining on the Strong-Christensen model with a definite expectation of positive effects in the area of syntactic maturity and a good likelihood of some improvement in writing quality as well (Stewart, 1978, p. 266).

Summary of Additional Sentence-Combining Research

Since the mid-1960's sentence combining has received a great deal of attention from researchers. At the elementary level, Hunt and O'Donnell (1970) reported significant syntactic gains achieved by fourth-graders exposed to a year-long sentence-combining curriculum. Syntactic fluency was measured on both controlled writing tasks and free writing samples. The experimenters also found significant gains in reading comprehension made by the Black students in their experimental group. Vitale et al. (1971) also reported significant syntactic gains for their Black fifth-graders who participated in an intensive 12-day sentence-combining regimen. Green (1972), also working with fifth-grade students, found that his sentence-combining group was significantly higher on mean number of words per clause in narrative writing only. However, this gain was not maintained on a delayed post-test.

In another elementary study, Levine (1976) reported positive effects for sentence-combining practice on the writing and reading abilities of third-graders. Similarly, Straw (1978) found that his experimental fourth-grade subjects gained not only in written syntactic fluency, but also in reading and listening comprehension.

Several additional studies have been conducted with students at the junior high and high school levels. Pedersen's (1977) seventh-grade sentence combiners achieved gains in syntactic fluency, overall writing quality, and semantic fluency (as measured by a Lexical Density assessment). Moreover, these gains were sustained on a delayed post-test. Phelps (1978), however, reported no significant gains for his eighth-grade

students after a 19-week sentence-combining program. In a ninth-grade study, Howie (1979) found significant gains in syntactic fluency in the descriptive mode, although there were no differences between the control and experimental groups in expository writing, reading comprehension, or attitudes toward writing. Callaghan (1977) and Sullivan (1977) conducted parallel studies with ninth and eleventh grade students, respectively. In both studies, the experimental students gained significantly in several measures of syntactic fluency and in positive attitudes toward writing. However, no differences were found between groups in overall writing quality or reading comprehension. Moreover, a delayed post-test revealed some slight erosion in the syntactic gains made by the experimental groups at both grade levels.

Finally, several college-level sentence-combining studies have also been reported. One early experiment by Ross (1971) showed positive results derived from a transformational grammar course that included some sentence-combining practice. At post-test, Ross's experimental freshmen wrote longer clauses, while at the same time reducing the incidence of errors in their writing. Maimon and Nodine (1978) reported significant syntactic gains as a result of sentence-combining practice in a freshman composition course. In contrast with Ross (1971), however, the experimenters cautioned that gains in syntactic fluency may initially lead to an increase in certain errors as students attempt to use more complex sentence structure. Menendez (1978), working with remedial college freshmen, reported gains on two measures of syntactic fluency for her experimental group. However, there was no significant difference between groups in writing quality or reading comprehension. Swan (1979) tested the effects of sentence-combining practice with college sophomores, juniors, and seniors. Over

a 15-week term, Swan found that syntactic gains were apparent in a controlled writing task, a timed free-writing exercise, and a student-edited writing sample.

Implications for Instruction

Based on the research discussed in this paper, several instructional implications can be suggested. First, teachers who incorporate a systematic program of sentence combining in their curriculum can expect, at the very least, that their students will produce more mature sentences than they would have ordinarily written. As Charles Cooper (1973) notes, sentence combining may thus provide a solution to one of the most frustrating problems faced by English teachers:

> Every child does eventually come to write more complex sentences--and several recent studies have traced that development--but every teacher watching this glacially slow development feels compelled to intervene. He cannot avoid asking what Piaget calls the American question: "How can I speed it up?" (Cooper, 1973, p. 96)

Second, there is also some evidence that sentence combining can lead to an overall improvement in writing quality (cf., O'Hare, 1973; Daiker et al., 1978). Even in those studies where the writing quality question was unresolved (e.g., Mellon, 1969; Perron, 1974), this much at least was certain: sentence combining produced no negative effects on student writing. On this point, then, the research does not offer a clear-cut indication that sentence combining alone will automatically lead to dramatic improvement in writing quality. Written composition certainly involves much more than simply manipulating syntactic structures. And although there are suggestions that the broad, rhetorical aspects of writing can be introduced through sentence-combining practice (e.g.,

Daiker et al., 1978), teachers might be better advised to use sentence combining as part of a larger instructional framework that treats all elements of the writing process.

A third instructional implication of the research is that sentence combining is not dependent upon a formal knowledge of grammar, either traditional or transformational. Evidence has shown that formal grammar study has little or no effect on writing improvement. The fact that students are able to identify grammatical structures in a given sentence is no guarantee that they will be able to use those structures correctly in their writing. Sentence combining, though, does not focus on grammatical analysis. Rather, the technique calls for the student to synthesize sentence elements, a process that is governed by the student's own internalized grammatical system. William Strong, in "Sentence Combining: Back to Basics and Beyond" (1976), summarizes this point:

> Through sentence combining, we're asking students to tap the linguistic power they already possess. Operationally, this means exercising the transformational repertoire in the context of writing rather than speaking--and then paying attention to the stylistic options that naturally emerge (Strong, 1976, p. 60).

The fourth major pedagogical implication that can be inferred from the research is that students generally enjoy working with sentence-combining problems. With the development of O'Hare's (1973) cuing system, sentence-combining exercises came to resemble puzzles or games. The use of uncued problems with older students (e.g., Daiker et al., 1978; Stewart, 1978) also stimulated creativity and motivation. By emphasizing the game-like quality of sentence-combining exercises, then, teachers can be reasonably sure that students will be genuinely motivated to solve the problems successfully.

Finally, one of the most significant conclusions that can be drawn from the research literature is that sentence combining can be an effective strategy in nearly every grade level across the academic spectrum. Some researchers have suggested that sentence-combining activities can begin as early as second or third grade (e.g., O'Hare, 1973; Levine, 1976), although fourth-grade is generally viewed as the optimal starting point. At any rate, sentence-combining practice can be valuable throughout the elementary, junior high, secondary, and college levels. In "An Outline for Writing Sentence-Combining Problems" (1973), Cooper suggests the following sequence for sentence-combining instruction:

> For children in the upper elementary grades the emphasis should be on the adjective problems. Beginning in Grade 7 the problems can be balanced between adjective embeddings and noun substitutions. Multiple embeddings and substitutions should be presented as soon as the students are able to handle them. Very capable high school students can move almost immediately to multiple embedding and substitution problems (Cooper, 1973, p. 99).

Furthermore, recent sentence-combining textbooks (e.g., O'Hare, 1975; Strong, 1973; Daiker et al., 1979) have also included practice with the free modifiers described by Christensen (1967, 1968a, 1968b).

In conclusion, then, the substantial body of research reviewed here supports sentence combining as an effective pedagogical strategy for improving student writing. In a recent paper presented at the 1978 Miami University Conference on Sentence Combining and the Teaching of Writing, John Mellon summarized the position of sentence combining in contemporary language arts instruction:

> For now we can brush aside the research reviewer's ritualistic caution, "more research is needed." More research on sentence combining is <u>not</u> needed, though more is welcome and more will be done. In fact, however, I don't know of any component in our arsenal

> of literacy-teaching methods that is better supported empirically than sentence combining. At the risk of sounding like a sloganizer from the Sixties, the best advice I can give teachers today, relative to sentence combining, is - Do it! (Mellon, 1979, p. 35)

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